

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 1.004.024 WO	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/NL2004/000863	International filing date (day/month/year) 10.12.2004	Priority date (day/month/year) 12.12.2003	
International Patent Classification (IPC) or national classification and IPC A22C11/00			
Applicant TOWNSEND ENGINEERING B.V. ET AL.			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 10 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 12.10.2005		Date of completion of this report 08.02.2006	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer von Arx, V. Telephone No. +31 70 340-2464	



INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/NL2004/000863

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

filed with telefax on 28.10.2005

Claims, Numbers

filed with telefax on 28.10.2005

Drawings, Sheets

as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/NL2004/000863

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-6
	No: Claims	7-15
Inventive step (IS)	Yes: Claims	1-6
	No: Claims	7-15
Industrial applicability (IA)	Yes: Claims	1-15
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following document:

D1: US-A-4418447

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses, see the whole document and particularly col. 5, line 47, to col 7, line 35, a method for phased separation of a sausage strand, comprising the processing steps of:

- A) supplying a sausage strand,
- B) positioning the sausage strand relative to a separating element,
- C) moving at least two pressing members (34) forming part of the separating element toward each other with a first movement such that the sausage strand is constricted locally,
- E) moving at least two cutting members (56) forming part of the same separating element toward each other such that the sausage strand is separated at the position of the sausage strand constricted locally during processing step C).

The subject-matter of claim 1 differs from this known method in that between steps C) and E) the pressing members 34 are moved apart.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The prior published documents, cited in the description or in the international search report, either taken individually or in combination do not disclose, suggest or reasonably lead the person skilled in the art to consider moving the pressing members (34) apart during a processing step D) between steps C) and E).

The person skilled in the art would not be able to combine all the features of claim 1 and as such arrive at the claimed method without an inventive activity.

Moreover, claims 2 to 6 are dependent on claim 1, and thus all the claims 1 to 6 satisfy the requirements of Article 33(2)(3) PCT.

The present application does not satisfy the criterion set forth in Article 33(2) PCT because the subject-matter of independent claims 7 and 13 is not new in respect of the prior art as defined in the regulations (Rule 64(1)-(3) PCT):

Document D1 discloses a separating element (see fig. 10) for phased separation of a sausage strand (58) comprising:

- at least two pressing members (34), which pressing members are relatively displaceable between a release position and an operative position in which the pressing members are placed closer together than in the release position (see figs. 2 and 4 to 7), and
- at least two cutting members (56) *forming part of and thus* assembled with the pressing members (34), which cutting members are relatively displaceable between a release position and a cutting position, whereby
- *each of the cutting members (56) form part of a respective pressing member (34) and* the cutting members (56) are *thus* rigidly paired to a pressing member (34) and
- a paired cutting member (56) and pressing member (34) are situated on opposite sides of the sausage strand (58) to be separated.

D1 also discloses that a plurality of such separating elements may be placed in line to form an assembly.

From the above it appears that all the features of claims 7 and 12 are known from this one document D1 at least by implication and the subject matter of said claims can therefore not be regarded as new.

Dependent claims 8 to 11 and 13 to 15 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, see document D1 and the corresponding passages cited in the search report.

Method for phased separation of a sausage strand, separating element and assembly of separating elements

The invention relates to a method for phased separation of a sausage strand. The invention also relates to a separating element for phased separation of a sausage strand according to the preamble of claim 7 and to an assembly of a plurality of such separating elements.

In the production of sausages it frequently occurs that a sausage strand (manufactured for instance by means of an extrusion process from dough or a dough of vegetable material) must be divided into smaller segments (individual sausages). Such a sausage strand can be, although it does not necessarily have to be, provided with a casing, which can for instance also be manufactured by means of an extrusion process. For the division of the sausage strand into individual sausages frequent use is made of a wheel with a plurality of separating elements. A drawback of such a wheel is that the quality of the separated sausages is not always satisfactory. In the European patent 1 263 293 a method and apparatus is described for phased separation of a sausage strand. Use is made herein of two co-acting wheels between which the sausage strand for separating is first pressed together at the locations where it will later actually be separated. At the locations where it is pressed together, the sausage strand is then separated by means of the separating elements. A drawback of the art described in the European patent is that when the sausage strand is pressed together between two co-acting wheels the separated sausages are still not of optimal quality, and that the flexibility of such an apparatus is limited (different wheels have to be mounted for different sausage lengths). This lesser quality relates in particular to sausage ends which are not round (for instance "pillow-shaped").

The object of the present invention is to provide improved means and an improved method with which a sausage strand can be separated in phases in simple manner such that the quality of the separation is improved compared to the prior art.

The invention provides for this purpose a method for phased separation of a sausage strand according to claim 1. The sausage strand is preferably supplied at a constant speed and along a part of the transport path of the sausage strand the separating element is

advanced parallel to the sausage strand. The different processing steps of phased separation of a sausage strand are thus performed with a single separating element. This has diverse advantages compared to the prior art method. Constriction of the sausage strand can thus be continued for a desired period. For a good local displacement of the sausage dough, the dough has to be pressed aside for a minimum period. Only if this displacement is continued for a sufficiently long period will the dough "set" in the desired state. Other than in the prior art, it is possible using the method according to the invention to continue the displacement for as long as desired. The time period required for displacement will vary in practice with different sausage types (depending on the quality of sausage dough, the dimensions of the sausage strand and the intended end result). In addition, the speed at which the pressing members move toward each other can also be adjusted, further increasing the control over the separating process. Another significant advantage is that the displacement of the dough and the actual separation are carried out by a single separating element; repositioning of cutting means after performing the local constriction of the sausage strand is unnecessary. It is not therefore possible to make any errors hereby during processing of the sausage strand. Another important advantage is that the orientation and the form of the local constriction to be made can be freely chosen. The form and orientation of the pressing members can after all be varied as desired; nor is this option available in the prior art. Particularly favourable results are thus found to be achieved when the constriction of the sausage strand realized during processing step C) has a form of elongate cross-section with a longitudinal axis of the constriction lying substantially perpendicular to the cutting direction of the cutting members. It is noted by way of elucidation that "moving toward each other" of the pressing members and the cutting members is not necessarily understood to mean the movement of both members. This is a displacement of the members relative to each other which is likewise realized if one of the members is stationary and the other member is displaced relative to the stationary member. Such a displacement of only one member also falls within the definition of "moving toward each other" of the members.

In yet another preferred application of the method, the sausage strand is locally constricted by at least partially displacing sausage dough locally from a casing. The casing (also referred to as "skin") is usually arranged to protect and shape the sausage dough. The presence of a casing simplifies the process of displacing the sausage dough;

the casing increases control over the movement of the sausage dough. The sausage dough can here be displaced such that casing portions of the sausage strand on opposite sides can be brought into contact with each during constricting of the sausage strand as according to processing step C). For an effective local displacement the pressing

5 members can be provided with co-acting contact surfaces between which the sausage strand is engaged. The choice and orientation of these contact surfaces can be freely determined. For further simplification and in order to obtain a "hard" synchronization of the operation of the pressing members and the cutting members of a separating element, in a preferred variant these are operated by a common drive. The pressing members can

10 be displaceable in parallel planes or they can be displaceable in the same plane. In this latter case it is possible to displace the dough completely out of a casing along a certain length, for instance over a length of about 10 mm, or a length smaller than 15 mm.

The invention also provides a separating element for phased separation of a sausage

15 strand according claim 7. "Release position" is understood to mean the position in which the pressing members leave a space between them such that a sausage strand can be placed unimpeded between the pressing members or the cutting members. In the operative position the pressing members exert a pressure on the sausage strand such that the sausage strand is constricted at the position where it is engaged. The cutting position

20 is understood to mean the situation where the cutting members, preferably provided with a cutting edge, are located a short distance from each other such that they together perform a cutting action on the sausage strand. This usually means in practice that the cutting members at least partially overlap each other. It is of great importance that the pressing members and the cutting members are assembled in order to thus form a single

25 separating element with which the whole process of phased separation can be carried out. Because of the rigid coupling of "paired" pressing members and cutting members, it is structurally extremely simple to make use of a single drive for a separating element. The integration of the pressing members and the cutting members into a single unit results in the advantages as already described above in respect of the method according

30 to the present invention.

In a preferred variant, the separating element also comprises drive means connected to the pressing members and cutting members. These can for instance be formed by an electric drive, pneumatic drive means, hydraulic drive means, cam followers connected

to the separating element which are adapted to co-act with cam guides (such as discs or tracks) and so on. It will be apparent that it is advantageous to couple the pressing members and the cutting members to common drive means.

- 5 An advantageous embodiment variant is characterized in that the contact side of the pressing member of a rigidly coupled assembly of pressing member and cutting member is directed toward the contact side of the cutting member coupled thereto. This will be further elucidated below with reference to an exemplary embodiment of the separating element according to the invention shown in the figures. For co-displacement of the
- 10 separating element with the sausage strand it is desirable that the separating element be supported by a displaceable holder.

- The invention moreover provides an assembly of a plurality of separating elements as described above, wherein the separating elements are placed in line. A sausage strand
- 15 must generally be separated at a large number of positions (with a fixed and substantially identical mutual spacing). In addition, the production of a sausage strand is usually a continuous process. In order to now provide sufficient separating capacity, it is advantageous to operate a plurality of separating elements successively in the line of the sausage strand. The separating elements can thus be placed on the periphery of a
- 20 rotatable wheel. An alternative is to assemble the separating elements on an endless conveyor. Such systems (wheel and endless conveyor) make it possible to also perform the phased separation in continuous manner. It is noted that it is also possible to place a number of lines with successive separating elements parallel and adjacently of each other, so that a plurality of sausage strands can be separated simultaneously.

- 25 For a simple and inexpensive driving thereof, the assembled separating elements are provided in a preferred embodiment with cam followers which co-act with a cam track likewise forming part of the assembly, which cam followers and cam track are relatively displaceable.

- 30 The invention will be further elucidated on the basis of the non-limitative exemplary embodiments shown in the following figures, wherein:
figure 1A shows a perspective view of a separating element according to the invention before commencement of a phased separating operation,

- figure 1B is a perspective view of the separating element shown in figure 1A during a first phase of the separating operation,
figure 1C is a perspective view of the separating element shown in figures 1A and 1B during a second phase of the separating operation,
- 5 figure 2A is a schematic side view of a separating element according to the invention during a first phase of the separating operation,
figure 2B is a schematic side view of the separating element shown in figure 2A during a second phase of the separating operation,
figure 3A shows a schematic side view of a pair of co-acting pressing members,
- 10 figure 3B shows a schematic side view of an alternative embodiment variant of a pair of co-acting pressing members,
figure 4 is a side view of an assembly of a plurality of separating elements according to the invention,
figure 5A shows a cross-section through a part of an unprocessed sausage strand,
- 15 figure 5B shows a cross-section through a part of a partially processed sausage strand, and
figure 5C shows a cross-section through a sausage strand divided into individual sausages.
- 20 Figure 1A shows a separating element 1 according to the invention which engages round an as yet unprocessed sausage strand 2. For this purpose the cutting members 3 (and the pressing members not shown in this figure) are moved so far apart that they leave sufficient space clear for the passage of sausage strand 2. Cutting members 3 are placed in a holder 5 for pivoting about a shaft 4. Also shown are cam followers 6 which
- 25 protrude under holder 5 and which are coupled to cutting members 3 and the pressing members for displacement thereof. A first phase of the method for separating the sausage strand 2 is shown in figure 1B. Cutting members 3 are pivoted further apart by displacing the cam followers 6. Hereby becoming visible are pressing members 7 which engage on, and locally constrict, the sausage strand 2. It is noted that cutting members 3
- 30 are each rigidly coupled in each case to the pressing member 7 situated on the opposite side of sausage strand 2. This will be further elucidated with reference to figures 2A and 2B. Figure 1C shows the actual separation of an individual sausage 8 from sausage strand 2. For this purpose the pressing members 7 are moved apart (relative to the

position as shown in figure 1B) and cutting members 3 are moved simultaneously toward each other in partially overlapping manner.

Figure 2A shows schematically two assembled pairs 20, 21 of respectively pressing member 22 and cutting member 23, and pressing member 24 and cutting member 25. Both pairs 20, 21 are rotatable about a shaft 26. Figure 2A shows the pairs 20, 21 in a situation where pressing members 22, 24 co-act. Figure 2B shows the same pairs 20, 21 of respectively pressing member 22 and cutting member 23, and pressing member 24 and cutting member 25, though now in a situation where cutting members 23, 25 co-act.

Figure 3A shows a possible design of two pressing members 30, 31. Recesses 33 are herein provided on the contact sides 32 of pressing members 30, 31 in order to thus define the form the constriction of a sausage strand will take. Figure 3B shows two other pressing members 34, 35, the contact sides 36 of which have an orientation different from contact sides 32 of pressing members 30, 31 shown in figure 3A. The position of a constriction of a sausage strand created by means of pressing members 34, 35 will also have a determined orientation.

Figure 4 shows an assembly 41 of a plurality of separating elements 42 in the form of a wheel 42. This wheel 42 is rotatable about a shaft 43. Through rotation of wheel 43 cam followers 44 of the individual separating elements 42 move over a cam guide 45 in stationary position. A continuous sausage strand 46 is fed as according to arrow P1 to wheel 42, whereafter the individual separating elements 42, actuated by cam guide 45, will perform the phased separating operation as illustrated in figures 1A-1C. After passing through the phased separating operation, separated sausages 47 are discharged by a belt conveyor 48 as according to arrow P2.

Figures 5A-5C finally show sausage strand 51 and the separated sausages 52 in successive phases of processing. Sausage strand 51 as shown in figure 5A has a centre consisting of dough 53 (for instance a dough formed by animal and/or vegetable material) which is enclosed by a casing 54. After a first processing of sausage strand 51 by means of pressing members (not shown in figure 5B), a local constriction 55 is created in sausage strand 51. After completing the separation, there remains of the sausage strand 51 only the individual sausages 52, see figure 5C. Particularly the

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finishing and closure (encasing of the sausage dough 53 by casing 54) of the outer ends
56 of sausages 52 can be readily controlled as a result of applying the method and/or
device according to the present invention.

Claims

1. Method for phased separation of a sausage strand (2, 46, 51), comprising the processing steps of:
 - 5 A) supplying a sausage strand (2, 46, 51),
 - B) positioning the sausage strand (2, 46, 51) relative to a separating element (1, 42),
 - C) moving at least two pressing members (7, 22, 24, 30, 31, 35, 35) forming part of the separating element (1, 42) toward each other with a first movement such that the sausage strand (2, 46, 51) is constricted locally,
 - 10 D) moving the pressing members (7, 22, 24, 30, 31, 35, 35) apart, and
 - E) moving at least two cutting members (3, 23, 25) forming part of the same separating element (1, 42) toward each other such that the sausage strand (2, 46, 51) is separated at the position of the sausage strand (2, 46, 51) constricted locally during processing step C).
- 15 2. Method as claimed in claim 1, **characterized in that** the sausage strand (2, 46, 51) is supplied at a constant speed and that along a part of the transport path of the sausage strand (2, 46, 51) the separating element (1, 42) is advanced parallel to the sausage strand (2, 46, 51).
- 20 3. Method as claimed in claim 1 or 2, **characterized in that** the sausage strand (2, 46, 51) is locally constricted by at least partially displacing sausage dough (53) locally from a casing (54) enclosing the sausage dough (53).
- 25 4. Method as claimed in claim 3, **characterized in that** the sausage dough (53) is displaced such that casing parts (54) of the sausage strand (2, 46, 51) on opposite sides are brought into contact with each during constricting of the sausage strand (2, 46, 51) as according to processing step C).
- 30 5. Method as claimed in any of the foregoing claims, **characterized in that** the pressing members (7, 22, 24, 30, 31, 35, 35) are provided with co-acting contact surfaces (32, 36) between which the sausage strand (2, 46, 51) is engaged.

6. Method as claimed in any of the foregoing claims, **characterized in that** the pressing members (7, 22, 24, 30, 31, 35, 35) and the cutting members (3, 23, 25) of a separating element (1, 42) are operated by a common drive.

5 7. Separating element (1, 42) for phased separation of a sausage strand (2, 46, 51), comprising:

- at least two pressing members (7, 22, 24, 30, 31, 35, 35), which pressing members (7, 22, 24, 30, 31, 35, 35) are relatively displaceable between a release position and an operative position in which the pressing members (7, 22, 24, 30, 31, 35, 35) are placed
10 closer together than in the release position, and

- at least two cutting members (3, 23, 25) assembled with the pressing members (7, 22, 24, 30, 31, 35, 35), which cutting members (3, 23, 25) are relatively displaceable between a release position and a cutting position,

characterised in that the cutting members (3, 23, 25) are each rigidly paired to a
15 pressing member (7, 22, 24, 30, 31, 35, 35) and a paired cutting member (3, 23, 25) and pressing member (7, 22, 24, 30, 31, 35, 35) are situated on opposite sides of the sausage strand (2, 46, 51) to be separated.

8. Separating element (1, 42) as claimed in claim 7, **characterized in that** the
20 separating element (1, 42) also comprises drive means connected to the pressing members (7, 22, 24, 30, 31, 35, 35) and cutting members (3, 23, 25).

9. Separating element (1, 42) as claimed in claim 8, **characterized in that** the
pressing members (7, 22, 24, 30, 31, 35, 35) and cutting members (3, 23, 25) are
25 coupled to common drive means.

10. Separating element (1, 42) as claimed in any of the claims 7-9, **characterized in that** the contact side (32, 36) of the pressing member (7, 22, 24, 30, 31, 35, 35) of a rigidly coupled pair (20, 21) of pressing member (7, 22, 24, 30, 31, 35, 35) and cutting
30 member (3, 23, 25) is directed toward the contact side of the cutting member (3, 23, 25) coupled thereto.

11. Separating element (1, 42) as claimed in any of the claims 7-10, **characterized in that** the separating element (1, 42) is supported by a displaceable holder (5).

12. Assembly (41) of a plurality of separating elements (1, 42) as claimed in any of the claims 7-11 **characterized in that** the separating elements (1, 42) are placed in line.

5 13. Assembly (41) of separating elements (1, 42) as claimed in claim 12, **characterized in that** the mutual distance between successive separating elements (1, 42) is constant.

10 14. Assembly (41) of separating elements (1, 42) as claimed in claim 12 or 13, **characterized in that** the separating elements (1, 42) are placed on the periphery of a rotatable wheel (43).

15 15. Assembly (41) of separating elements (1, 42) as claimed in any of the claims 12-14, **characterized in that** the separating elements (1, 42) are provided with cam followers (6, 44) which co-act with a cam track (45) likewise forming part of the assembly (41), which cam followers (6, 44) and cam track (45) are relatively displaceable.